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| APPLICATION NO.                                  | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/748,104                                       | 12/29/2003  | Fay Chong JR.        | 188178/US           | 6929             |
| 66083  | 7590        | 01/02/2008           | EXAMINER            |                  |
| SUN MICROSYSTEMS, INC. c/o DORSEY & WHITNEY, LLP |             |                      | KIM, PAUL           |                  |
| 370 SEVENTEENTH ST.                              |             |                      |                     |                  |
| SUITE 4700                                       |             |                      | ART UNIT            | PAPER NUMBER     |
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

|                              |                      |                  |
|------------------------------|----------------------|------------------|
| <b>Office Action Summary</b> | Application No.      | Applicant(s)     |
|                              | 10/748,104           | CHONG, FAY       |
|                              | Examiner<br>Paul Kim | Art Unit<br>2161 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

1) Responsive to communication(s) filed on 05 November 2007.  
 2a) This action is FINAL.                    2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

4) Claim(s) 1,3-6,8-15,17-20,22-29,31-34 and 36-43 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_\_ is/are allowed.  
 6) Claim(s) 1,3-6,8-15,17-20,22-29,31-34 and 36-43 is/are rejected.  
 7) Claim(s) \_\_\_\_\_ is/are objected to.  
 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

1) Notice of References Cited (PTO-892)  
 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)  
 3) Information Disclosure Statement(s) (PTO/SB/08)  
 Paper No(s)/Mail Date 12/5/07.

4) Interview Summary (PTO-413)  
 Paper No(s)/Mail Date. \_\_\_\_\_.  
 5) Notice of Informal Patent Application  
 6) Other: \_\_\_\_\_.

**DETAILED ACTION**

1. This Office action is responsive to the following communication: Amendment filed on 5 November 2007.
2. Claims 1, 3-6, 8-15, 17-20, 22-29, 31-34, and 36-43 are pending and present examination.

***Continued Examination Under 37 CFR 1.114***

3. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 5 November 2007 has been entered.

***Response to Amendment***

4. Claims 1, 15, 29 and 43 have been amended.
5. No claims have been further added.
6. No claims have been further cancelled.

***Information Disclosure Statement***

7. The information disclosure statement (IDS) submitted on 5 December 2007 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

***Claim Rejections - 35 USC § 102***

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

9. **Claims 1, 6, 11, 15, 20, 25, 29, 34, 39, and 43** are rejected under 35 U.S.C. 102(e) as being anticipated by DeKoning (U.S. Patent No. 6,691,245, hereinafter referred to as DeKoning), filed on 10 October 2000, and issued on 10 February 2004.

10. **As per independent claims 1, 15, 29, and 43,** DeKoning teaches:

A method for preserving data in a data storage system, the method comprising:

receiving a command to preserve data in the data storage system {See DeKoning, C8:L1-12, wherein this reads over "synchronization updates between the local and remote storage device 108 and 110 occur at predetermined periodic intervals"};

receiving a first data being written to a data block on a first storage volume prior to receiving the command {See DeKoning, C7:L63-66, wherein this reads over "all 'write' procedures to the local storage device 108 by the local host device 106 lead to synchronization updates to the remote storage device 110"};

determining whether the data block is stored on a first storage image, the first image being a copy on write snapshot of the first storage volume created in response to the command, the operation of determining based on indication information associated with the first storage image {See DeKoning, C7:L6-21, wherein this reads over "checkpoint information 116a is maintained with and correlated to the local volume 128 and its mirrored volume 132, and checkpoint information 116b is maintained with and correlated to the local volume 130 and its mirrored volume 134"};

writing the first data to the data block on the first storage image when the data block is stored on the first storage image {See DeKoning, C8:L13-17, wherein this reads over "[u]pon performing a synchronization update procedure between the local and remote storage devices 108 and 110, new data 152 from the host device 106 that is stored in local volume 128 is mirrored in mirrored volume 132"};

writing the first data to the data block on a second storage image when the data block is stored on a second image {See DeKoning, C8:L13-17, wherein this reads over "[u]pon performing a synchronization update procedure between the local and remote storage devices 108 and 110, new data 152 from the host device 106 that is stored in local volume 128 is mirrored in mirrored volume 132"}; and

wherein the copy on write snapshot occurs without an application's read/write activities being in a quiescent state<sup>1</sup>.

**11. As per dependent claims 6, 20, and 34, DeKoning teaches:**

The method of claim 1, further comprising:

receiving a second data being written to the data block on the second storage volume after receiving the command {See DeKoning, C9:L10-13, wherein this reads over "the client devices 104 (FIG. 1) switch from using the local host and storage devices . . . to using the remote host and storage devices . . . for primary data storage"};

determining whether the data block is stored on the first storage image or the second storage image {See DeKoning, C7:L6-21, wherein this reads over "checkpoint information 116a is maintained with and correlated to the local volume 128 and its mirrored volume 132, and checkpoint information 116b is maintained with and correlated to the local volume 130 and its mirrored volume 134"};

when the data block is stored on the second storage image, replicating the data block on the second storage image to the first storage image {See DeKoning, C9:L39-44, wherein this reads over "[t]he remote storage device 110 replaces the data in the affected data volumes 126 with the volume image"} and updating the indication information {See DeKoning, C9:L13-18, wherein this reads over "data and information is exchange between the business continuance client . . . the remote host device 109 and the remote storage device 110 according to the exemplary data flow chart show in FIG. 5"}; and

writing the second data to the data block on the second storage image {See DeKoning, C9:L10-13, wherein this reads over "the client devices 104 (FIG. 1) switch from using the local host and storage devices . . . to using the remote host and storage devices . . . for primary data storage"}.

**12. As per dependent claims 11, 25, and 39, DeKoning teaches:**

The method of claim 1, further comprising:

receiving a request to read from a data block on the first storage volume {See DeKoning, C6:L63-65, wherein this reads over "The data volumes 124 are typically accessed by the local host device 106 (FIG. 1) according to access requests from the client devices 104 (FIG. 1). After failure of the local host and/or storage device 106 or 108 (FIG. 1), the data volumes 126 are typically accessed by the remote host device 109 according to the access requests from the client devices 104."};

determining whether the data block is stored on the first storage image or on the second storage image, based on indication information associated with the first storage image {See DeKoning, C6:L63-65, wherein this reads over "The data volumes 124 are typically accessed by the local host device 106 (FIG. 1) according to access requests from the client devices 104 (FIG. 1). After failure of the local host and/or storage device 106 or 108 (FIG. 1), the data volumes 126 are typically accessed by the remote host device 109 according to the access requests from the client devices 104."};

<sup>1</sup> The Examiner notes that it would be inherent to the claimed invention that the copy on write snapshot occurs without an applicant's read/write activities being in a quiescent state. Wherein the application executes the copy on write snapshot of data in the data storage system, said application would not be in a quiescent state as the application would be writing data to either a first storage image or a second storage image.

devices 104 (FIG. 1). After failure of the local host and/or storage device 106 or 108 (FIG. 1), the data volumes 126 are typically accessed by the remote host device 109 according to the access requests from the client devices 104."};

reading the data block from the first storage image if the data block is stored on the first storage image<sup>2</sup>; and

reading the data block from the second storage image if the data block is stored on the second storage image.

***Claim Rejections - 35 USC § 103***

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

14. **Claims 3, 8, 17, 22, 31, and 36** are rejected under 35 U.S.C. 103(a) as being unpatentable over DeKoning, in view of Arnon et al (U.S. Patent No. 6,493,796, hereinafter referred to as Arnon), filed on 1 September 1999, and issued on 10 December 2002.

15. **As per dependent claims 3, 17, and 31**, while DeKoning fails to expressly disclose the use of "a lookup table to determine whether there is an entry associated with the data block, the lookup table being associated with the first storage image," Arnon discloses a means for checking a table to see if there is a mirroring link operational for the mirroring group {See Arnon, Figures 4A-B and 5; and C17:L2-12, wherein this reads over "checking the mirroring link status flags in the table 402 associated with the mirroring group 107 in which the destination storage device 110 is included to determine whether at least one mirroring link 112 is operational for the mirroring group 108"}. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the above

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<sup>2</sup> The Examiner notes that lines 6-9 of the claims present optionally recited language in that reading the data blocks from the first and second storage image only occur "if the data block is stored on the first storage image" and "if the data block is stored on the second storage image" respectively. Accordingly, since said optionally recited language lacks patentable weight, prior art references will not be applied for the purposes of this examination.

invention suggested by DeKoning by combining it with the invention disclosed by Arnon. That is, the inclusion of the disclosed invention in Arnon would provide a means for determining whether the data block is stored on the first image.

One of ordinary skill in the art would have been motivated to do this modification so that a lookup table may be utilized in the organization of data blocks and their corresponding storage images.

16. **As per dependent claims 8, 22, and 36,** while DeKoning fails to expressly disclose the use of "a lookup table to determine whether there is an entry associated with the data block, the lookup table being associated with the first storage image," Arnon discloses a means for checking a table to see if there is a mirroring link operational for the mirroring group {See Arnon, Figures 4A-B and 5; and C17:L2-12, wherein this reads over "checking the mirroring link status flags in the table 402 associated with the mirroring group 107 in which the destination storage device 110 is included to determine whether at least one mirroring link 112 is operational for the mirroring group 108'}. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the above invention suggested by DeKoning by combining it with the invention disclosed by Arnon. That is, the inclusion of the disclosed invention in Arnon would provide a means for determining whether the data block is stored on the first image.

Additionally, it is noted that the claims optionally recite the method step of "creating the entry associated with the data block" as the creation of said entry is only done "if the entry does not exist." Accordingly, for the purposes of this Office action, prior art will not be applied to the aforementioned optional method step.

One of ordinary skill in the art would have been motivated to do this modification so that a lookup table may be utilized in the organization of data blocks and their corresponding storage images.

17. **As per dependent claims 12, 26, and 40,** while DeKoning fails to expressly disclose the use of "a lookup table to determine whether there is an entry associated with the data block, the lookup table being associated with the first storage image," Arnon discloses a means for checking a table to see if

there is a mirroring link operational for the mirroring group {See Arnon, Figures 4A-B and 5; and C17:L2-12, wherein this reads over "checking the mirroring link status flags in the table 402 associated with the mirroring group 107 in which the destination storage device 110 is included to determine whether at least one mirroring link 112 is operational for the mirroring group 108"}. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the above invention suggested by DeKoning by combining it with the invention disclosed by Arnon. That is, the inclusion of the disclosed invention in Arnon would provide a means for determining whether the data block is stored on the first image.

Additionally, it is noted that the claims optionally recite the method step of "creating the entry associated with the data block" as the creation of said entry is only done "if" the entry does not exist." Accordingly, for the purposes of this Office action, prior art will not be applied to the aforementioned optional method step.

One of ordinary skill in the art would have been motivated to do this modification so that a lookup table may be utilized in the organization of data blocks and their corresponding storage images.

18. **Claims 4, 9, 18, 23, 32, and 37** are rejected under 35 U.S.C. 103(a) as being unpatentable over DeKoning, in view of Mutalik et al (U.S. Patent No. 7,149,787, hereinafter referred to as Mutalik), filed on 7 June 2001, and issued on 12 December 2006.

19. **As per dependent claims 4, 9, 18, 23, 32, and 37**, while DeKoning fails to expressly disclose the use of locks in storing data to a data block, Mutalik discloses a means for acquiring and releasing a lock {See Mutalik, C14:L47-57, wherein this reads over a implementations of a read-lock and a write-lock"}. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the above invention suggested by DeKoning by combining it with the invention disclosed by Mutalik. That is, the inclusion of the disclosed invention in Mutalik would provide a means for locking the second storage image for write purposes.

One of ordinary skill in the art would have been motivated to do this modification so that other processes and/or users may not access the data block while a write process is underway such that the data block may not be erroneously corrupted by said other processes and/or users.

20. **Claims 13, 27, and 41** are rejected under 35 U.S.C. 103(a) as being unpatentable over DeKoning, in view of Arnon, and in further view of Mutualik.

21. **As per dependent claims 13, 27, and 41**, while DeKoning and Arnon fail to expressly disclose the use of locks in storing data to a data block, Mutualik discloses a means for acquiring and releasing a lock {See Mutualik, C14:L47-57, wherein this reads over a implementations of a read-lock and a write-lock"}. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the above inventions suggested by DeKoning and Arnon by combining it with the invention disclosed by Mutualik. That is, the inclusion of the disclosed invention in Mutualik would provide a means for locking the second storage image for write purposes.

One of ordinary skill in the art would have been motivated to do this modification so that other processes and/or users may not access the data block while a write process is underway such that the data block may not be erroneously corrupted by said other processes and/or users.

22. **Claims 5, 10, 14, 19, 24, 28, 33, 38, and 42** are rejected under 35 U.S.C. 103(a) as being unpatentable over DeKoning, in view of Mutualik, and in further view of Official Notice.

23. **As per dependent claims 5, 10, 14, 19, 24, 28, 33, 38, and 42**, while DeKoning and Mutualik fail to expressly disclose that "the lock mechanism is maintained independent to the first and the second storage images," the Examiner takes Official Notice that it would have been obvious to one of ordinary skill in the art at the time the invention was made to have said lock mechanism be separate and independent from the first and second storage images. That is, one of ordinary skill in the art would ably recognize that having an independent lock mechanism such that the lock mechanism not take part in the backup operation.

***Response to Arguments***

24. Applicant's arguments filed 5 November 2007 have been fully considered but they are not persuasive.

a. Rejections under 35 U.S.C. 102

Applicant asserts the argument that DeKoning fails to disclose the feature of having "the copy on write snapshot occur without an application's read/write activities being in a quiescent state." See Amendment, Page 10. The Examiner respectfully disagrees. It is noted that wherein the application executes the copy on write snapshot of data in the data storage system, said application would not be in a quiescent state as the application would be writing data to either a first storage image or a second storage image. Applicant's newly amended claim limitation fails to specifically recite that the referenced application be one that is running on the local host device. Therefore, given the scope of the claim limitation, the Examiner notes that the application may indeed be the one executing the claimed method of writing the data such that the copy on write snapshot would inherently not be in a quiescent state.

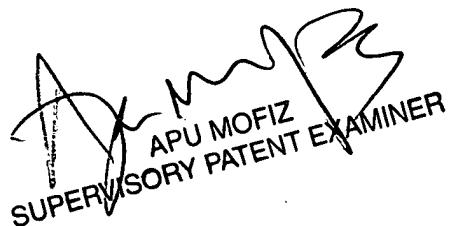
***Conclusion***

25. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Paul Kim whose telephone number is (571) 272-2737. The examiner can normally be reached on M-F, 9am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Apu Mofiz can be reached on (571) 272-4080. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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